

crannog. The other, the position of which was not determined, has two circular grooves or rings round the cup, the outer of which is 9 inches in diameter (Fig. 3).



FIG. 3.—Cup Stone (Scale  $\frac{1}{2}$ ).

*Other Stone Relics.*—Amongst a variety of other stone relics there is one peculiar implement manufactured out of a bit of hard trap-rock. It presents two flat surfaces 3 inches in diameter, with a round periphery, and is  $1\frac{1}{8}$  inch thick.

*Flint implements.*—Only three flint implements were found on the crannog—a large knife flake 3 inches long and  $1\frac{1}{2}$  inch broad; the posterior portion of another flake; and a beautifully-chipped horseshoe-shaped scraper here figured (Fig. 4).

*Spindle whorls.*—Three small circular objects, supposed to be spindle whorls, are here classed together. Two are made of clay, and were found in the relic bed near the fireplaces. The smaller of the two (Fig. 5) is



FIG. 4.—Flint Scraper (Scale  $\frac{1}{2}$ ).



FIG. 5.—Clay Spindle Whorl (Scale  $\frac{1}{2}$ ).

$1\frac{1}{2}$  inch in diameter, and has a small round hole in the centre; the other has a diameter of  $1\frac{3}{4}$  inch, and is only partially perforated, just sufficiently to indicate that the act of perforation had been commenced, but not completed. The third object is a smooth, flat, circular bit of stone,  $1\frac{1}{2}$  inch in diameter and  $\frac{1}{2}$  inch thick, and is perforated in the centre like a large bead.

(To be continued.)

### NOTES

THE Royal Society of Edinburgh has awarded the Keith Medal for the biennial period 1877-79 to Prof. Fkeeming Jenkin for his paper on the application of graphic methods to the determination of the efficiency of machinery.

PROF. HENRY J. S. SMITH, F.R.S., Savilian Professor of Geometry in the University of Oxford, has been made a Corresponding Member of the Academy of Science of Berlin.

ON the 16th inst. the International Congress of Meteorology will meet at Vienna.

THE honorary degree of LL.D. has been conferred by the University of Glasgow on Mr. Edward John Routh, M.A., F.R.S., and Dr. Michael Foster, F.R.S.

PROF. W. H. FLOWER, LL.D., F.R.S., will give a discourse at the Royal Institution, on Fashion in Deformity, at the evening meeting on Friday, May 7.

PROF. HUXLEY will deliver the inaugural address at the opening of the Science College at Birmingham on October 1.

SIR WILLIAM THOMSON will preside at the meeting of the Physical Society on Saturday afternoon, and will make some brief communications to the Society.

PROF. HENRY TANNER, F.C.S., Senior Member of the Royal Agricultural College, and Examiner in the Principles of Agriculture under the Government Department of Science, has been appointed Professor of the Principles of Agriculture in the Royal Agricultural College, Cirencester.

THE fifty-first anniversary meeting of the Zoological Society was held last week. The report of the council was read by Mr. Selater, F.R.S., the secretary. It stated that the number of Fellows on December 31, 1879, was 3,364 against 3,415 at the same date of the previous year, 145 new Fellows having been elected, and 189 removed by death or other causes during the year. In consequence of the bad weather, which had seriously affected the garden receipts, and of the general depression in business which had prevailed in 1879, the income of the society showed a falling off as compared with that of 1878, but not to any serious amount; the total receipts having been 26,463*l.* in place of 27,944 in 1878. The total assets of the society on December 31 last were estimated at 28,051*l.*, and the liabilities at 9,960*l.* The number of visitors to the gardens in 1879 had been 643,000, against 706,713 in 1878.

THE general meeting of the German Geometrical Society will be held at Cassel on July 4-7 next.

IN the last week of April an extraordinary fact was observed at Montsouris. We have stated already that the electrical observations are taken eight times daily with a Thomson electrometer and recorded; out of the eight readings registered on April 28 not less than six were negative, and on the following day seven were of the same sign. The occurrence is so extraordinary that it has been referred to in the papers as a fair characteristic of the season.

A LARGE and influential committee of shipbuilders and marine engineers has been formed in Glasgow for the purpose of promoting an exhibition of naval and marine engineering models in Glasgow. It is proposed that the exhibition shall be opened in the Corporation Galleries in November and remain open for six months. Mr. James Paton, the Superintendent of the Glasgow Museum and Galleries, has been appointed Secretary to the Committee.

AT the next meeting of the Society of Telegraph Engineers Dr. Siemens is going to bring forward his latest development of his dynamo machine, and of the influence of the electric light on vegetation.

THE Whit-Monday excursion of the Geologists' Association will be to Oxford, under the direction of Prof. Prestwich and Mr. James Parker. It will last over two days. The long excursion of the Association will be to Bristol on August 2 and following days.

FROM the Report of the New York Central Park Menagerie we learn that that establishment has now 423 mammals, representing 55 genera and 98 species; 753 birds, of 102 genera, 134 species; 30 reptiles, of 8 genera and 10 species; or 1,205 animals in all. The additions in 1879 numbered 668.

HEYWOOD of Manchester has issued, for the small price of sixpence, the eleventh series of the Manchester Science Lectures for the People, containing lectures on "Islands," by Mr. A. R. Wallace; "The Age of Dragons," by Mr. B. W. Hawkins; "Palestine in its Physical Aspects," by Canon Tristram; and

"Traps to Catch Sunbeams," by Capt. Abney. We are sorry to learn from Prof. Roscoe's preface that the interest in these lectures having died out, they are to be discontinued. Nevertheless, as he says, they have undoubtedly done great good both when delivered and in the remarkably cheap form in which they have been published. The series, as a whole, has been a genuine success.

WE understand that Dr. James Geikie, F.R.S., will shortly send to press a work entitled "Prehistoric Europe—a Geological Sketch," which treats of the principal climatic and geographical changes which have taken place in our continent since the commencement of the Pleistocene or Quaternary period. Mr. Stanford will be the publisher.

THE Council of the Society of Arts have decided to summon a public Conference to consider the question of supplying London with pure water. The date for the Conference has been fixed for Monday, May 24, and succeeding days. The arrangements for the Conference are now being considered by a committee, and full announcements will be made as early as possible.

SINCE November last, instruction by means of lectures and laboratory practice, in connection with the City and Guilds of London Institute for the Advancement of Technical Education, has been given during the evening in Chemistry and Physics as applied to the Arts and Manufactures, by Prof. Armstrong, Ph.D., F.R.S., and Prof. Ayrton, A.M. Inst. C.E., in rooms at the Cowper Street Schools, Finsbury. On and after May 10, day classes will also be established, adapted to the scientific requirements of persons partially engaged, or intending to engage, in the manufacturing industries. The object of these day classes is to afford such preliminary training as is necessary for those who may desire, later on, to study particular branches of Applied Chemistry or Physics, for which special accommodation will be provided in the new buildings. Two courses, each of twenty-four lectures, in Chemistry and Physics will be given on two afternoons per week during May, June, and July, for imparting such knowledge of the general principles as is necessary for the after-understanding of the various branches of Applied Chemistry and Physics:—Chemistry, Wednesdays and Fridays, at 3 to 4 o'clock; Physics, Wednesdays and Fridays, at 4 to 5 o'clock. Prof. Ayrton will also give a special laboratory and tutorial course in Electrical Engineering; and Prof. Armstrong will give a similar course for instruction in Photographic Chemistry. Students desirous of attending either of these courses are requested to communicate with the respective Professors at the present temporary laboratories, Cowper Street, Finsbury, E.C., before May 10, stating the times at which they could attend, and the maximum number of hours they could devote to the subject.

WE learn from Catania, under date April 26, that the inhabitants were apprehending an eruption of Etna. An immense cloud of smoke has been observed.

A PARISIAN speculator has inaugurated the aeronautical season by a private ascent on April 25 at La Villette gasworks. The balloon, of only 300 cubic meters capacity, bore one aeronaut, with 30 kilograms of handbills, which were distributed all over Paris. The wind being slight, with a favourable direction, thousands of these prospectuses were picked up by street passengers and largely read. The whole expense of the aerial expedition, gas and everything, did not exceed 10*l.* sterling.

THE phylloxera has made its appearance in the vineyards on Vesuvius and the opposite part of the Gulf at Puzzuoli and Fianura. Much alarm prevails. Precautionary measures are being taken. In Sicily the phylloxera, till now confined to Caltanissetta, is likewise reported near Messina.

AT the Annual Meeting of the Royal Institution on May 1, the Annual Report of the Committee of Visitors for the year 1879, testifying to the continued prosperity and efficient management of the Institution, was read and adopted. The real and funded property now amounts to nearly 85,000*l.*, entirely derived from the contributions and donations of the Members. Forty-nine new Members paid their admission fees in 1879.

THE *Japan Gazette* states that the line of railway which has been in contemplation for some time past between Tokio and Mayebashi will soon be commenced. The surveys are completed, and it is said that the line will traverse a rich district, and is expected to prove a great benefit to the country.

AN exhibition of apparatus and products relating to bee-culture will be held at Schwerin on August 28-30 next.

THE Electrotechnical Society at Berlin, which was founded on December 20, 1879, begins the second quarter of its existence with no less than 1,248 members.

THE Emperor of Austria has presented the large gold medal "for arts and sciences" to Dr. Karl Ritter von Scherzer in recognition of his latest work, "Die britischen Welt-Industrien."

THE Report of the Rugby School Natural History Society for 1879 is fairly encouraging. Several creditable papers are given by the members; we should like to see more papers of this class and fewer lectures by grown-up outsiders, some of which seem to us quite inappropriate in a Report of this kind.

"THE International Dictionary for Naturalists and Sportsmen in English, French, and German," by Mr. Simpson-Baikie (Trübner and Co.), is a very useful book of reference, and contains a good many scientific terms, especially connected with natural history.

"THE Sportsman's Guide" to the rivers, lochs, moors, and deer forests of Scotland comes once more to remind us of the hills and the heather, and to recall the memory of pleasant days spent on loch and river. It bears evidence of careful revision, and we are sure will prove useful to the tourist of scientific tastes, even if he be no disciple of the rod or gun.

It is known that M. Jamin, member of the French Institute, has patented an electric lamp in which the light is directed by an electrical current. A public company has been formed with a capital of 8,000,000 francs for the working of the patent.

THE French Minister of Fine Arts has entered into an agreement with the Jablochkoff Electric Light Company to light the palace during the whole of the two months devoted to the exhibition. The number of lights fed by the machinery is about 400, and the motive power regarded at about 320 horses. The inauguration was to take place on May 1, and a large crowd had congregated to witness the process. But the crank of one of the principal engines broke, and it was necessary to postpone the opening for a few days. In spite of the growing opposition of the friends of the gas company, M. Garnier, the architect of the Paris Opera, will establish a trial of the principal electrical burners, to decide which is the more really fit for use in the house.

THE additions to the Zoological Society's Gardens during the past week include a Common Ocelot (*Felis pardalis*) from South America, presented by Mr. Stephenson Clarke; two Elliot's Guinea Fowls (*Numida dolioti*) from East Africa, presented by the Rev. Thos. Wakefield; two American Barn Owls (*Strix flammea*) from Jamaica, presented by Mr. G. E. Dobson, C.M.Z.S.; a Koala (*Phascolarctus cinereus*) from South-East Australia, a Grey Squirrel (*Sciurus cinereus*) from North America, two Blue-streaked Lories (*Eos reticulata*) from Timor

Laut, two Prince Albert's Curassows (*Crax alberti*) from Columbia, purchased; two Common Foxes (*Canis vulpes*), four Chilian Pintails (*Dafila spinicauda*), bred in the Gardens.

### OUR ASTRONOMICAL COLUMN

THE COMET OF 1106.—Amongst the comets which were thought to present certain indications of identity with the great comet of 1843 was that recorded by a large number of European historians, as well as in the Chinese Annals, in the year 1106. The circumstances of its appearance may be thus briefly stated: On the 4th of February, or, according to others, on the 5th, a star was seen which was distant from the sun "only a foot and a half"; it was observed from the third to the ninth hour of the day. Matthew Paris and Matthew of Westminster distinctly term it a comet. Pingré, not having the experience of the comet of 1843 as a precedent, questioned the possibility of seeing one of these bodies at so small a distance from the sun as the above expression may be taken to imply. Now, however, we are able to connect, with much probability, the star viewed in the day-time with the comet which on February 7 was discovered in Palestine about the commencement of the sign Pisces. On this day, we are told by three contemporary writers, a comet appeared in that quarter of the sky where the sun sets in winter, and occasioned great surprise; a white ray extended from it to a great distance. From the time of its first appearance "the comet itself and the ray, which had the whiteness of snow, diminished day by day." Others, on the contrary, say that the train, which had a more than milky whiteness, appeared to increase daily. In the west of Europe it does not seem to have been remarked till February 16 or 18. According to some writers it was visible only a fortnight, others say that it continued to shine for forty days, or during the whole of Lent, from February 7 to March 25; an eye-witness records that after fifty days the most acute vision only sufficed to distinguish it with difficulty. There is similar contradiction respecting the aspect of the comet, though most of the historians testify to its great brightness and apparent magnitude. On February 10, according to Gaubil's manuscript, used by Pingré for his "Cometographie," it was near the end of the sign Pisces, with a tail 60° in length. European chronicles mention that the tail extended to the beginning of the sign Gemini, under the constellation of Orion, whence, as Pingré points out, the latitude of the comet must have been south, while as the sun was in 25° of Aquarius, it could hardly be less advanced than 10° or 12° of Pisces to be seen in the evening after sunset. Thence, about February 16 or 18, it moved to the western quarter of the heavens, and after many days had elapsed, as Pingré records: "La comète parut du côté du septentrion vers l'occident: sa queue, semblable à une grand poutre, regardoit la partie du ciel qui est entre le septentrion et l'orient; on la voyoit jusque vers le milieu de la nuit. Durant vingt-cinq jours elle brilloit de la même manière à la même heure." Williams, in his account of comets mentioned in the Chinese annals, has a notice of the one in question. In the reign of Hwuy Tsung, the 5th year of the epoch Tsung Ning, the 1st moon, day Woo Seuh (1106, February 10), a comet appeared in the west. It was like a great Pei Kow (a kind of vessel or measure). It appeared like a broken-up star. It was 60 cubits in length and 3 cubits in breadth. Its direction was to the north-east: it passed the sidereal division Kwei (determined by  $\beta$ ,  $\delta$ ,  $\epsilon$  Andromedæ and stars in Pisces), and through the divisions Lew (determined by  $\alpha$ ,  $\beta$ ,  $\gamma$  Arietis), Wei (by the three stars of Musca), Maou (by the Pleiades), and Peih (by  $\alpha$ ,  $\gamma$ ,  $\delta$ , &c., Tauri). It then entered the clouds and was no more seen. Williams, doubtless influenced by this last expression, and the object having been said to resemble a broken-up star, and probably overlooking the presence of the comet recorded by the European historians in the same part of the sky, adds: "This appears to have been a large meteor, as it seems to have been seen for a short time only." But there can be little hesitation, we think, in identifying the body remarked in China with the European comet, its track through the constellations, as given by Williams, which agrees with Gaubil's manuscript, representing very satisfactorily the particulars found in the European chronicles.

In 1843 Laugier and Mauvais, reducing their elements of the great comet of that year to 1106, and assuming the perihelion passage to have taken place on February 3, found the following geocentric track.

Feb. 4, Long. 324, Lat. - 3	Feb. 16, Long. 4, Lat. - 23
7, " 335, " - 10	March 5, " 40, " - 28
10, " 345, " - 16	25, " 60, " - 27

And they conclude, "en admettant que la comète de 1106 est une apparition de la comète de 1843, toutes les observations sont satisfaites." It is not easy to see how such an inference can have been drawn in face of the circumstances mentioned by the historians during the later period of the comet's visibility, when it was seen to the north of west, with a tail extending towards the north-east; a condition wholly incompatible with the elements of the comet of 1843, which body did not remain on the northern side of the ecliptic so long as three hours. On reducing Hubbard's parabola of 1843 to 1106 we have the following positions, assuming perihelion passage February 3·5 G.M.T.:—

G.M.T.	h.	Long.	Lat.	Log. <i>r</i> .	Log. $\Delta$ .	Intensity of Light.
Feb. 4,	0 ...	322°9 ...	- 1°7 ...	8·8080 ...	9·9704 ...	277·6
	19, 8 ...	12°6 ...	- 25°1 ...	9·8377 ...	9·9543 ...	2·6
March 25,	12 ...	60°3 ...	- 27°3 ...	0·1725 ...	0·2619 ...	0·13

These places are in agreement with those found by Laugier and Mauvais; that for March 25 corresponds to R.A. 63°·7, Decl. - 6°·4.

It is well known that the comet of 1106, with better reason, was long supposed to be identical with the famous comet of 1680. That point has been discussed elsewhere. Our object now, since the possibility of the identity of the comet of 1106 with that of 1880 and 1843 has been again mooted, is to draw attention to the main difficulty that exists in the acceptance of the idea.

### PHYSICAL NOTES

M. ANTOINE BREGUET, at a lecture upon Recent Advances in Telegraphy, exhibited some ingenious apparatus illustrating the principles of the duplex and quadruplex telegraph, the actions of the electric currents being most successfully represented by the flow of water in tubes.

PROF. CARMICHAEL describes, in the *American Journal of Science*, a device for rendering the sonorous vibrations of a flame visible to a whole audience. He passes coal-gas through a König's manometric capsule, and then leads it by a tube into a burner inclosed in a small mica cylinder or lantern, which is rotated either in a vertical or a horizontal plane. The ring of light thus produced is broken up by the sonorous vibrations into a serrated form, the forms of the serrations varying with the nature of the sound. To increase the brilliancy of the light the gas is previously passed over a sponge soaked in some volatile hydrocarbon such as "gasoline" or "benzoline," and oxygen is also supplied into the mica lantern. A shrill whistle produces very fine serrations invisible thirty feet away. The human voice at ordinary loudness produces serrations two or three inches deep round the ring. A modified capsule placed upon the various parts of a vibrating body serves to investigate their modes of vibration, nodal points, &c.

SOME curious experiments on the magnetic behaviour of elder-pith have lately been made by M. Ader. Pith-balls placed in a powerful magnetic field are strongly attracted.

PROF. ROWLAND contributes a long and careful memoir upon thermometry and the mechanical equivalent of heat to the *Transactions of the American Academy of Arts and Sciences*. His results differ by about 25 per cent. from the accepted numerical determinations of Joule's equivalent. Amongst other matters noticed in this memoir is an alleged decrease in the specific heat of water at higher temperatures.

A CONTEMPORARY gives the following method of illustrating the indestructibility of matter:—Two sealed glass tubes of equal weight, one of them containing oxygen and a little powdered charcoal, are prepared. The charcoal may be caused to burn away completely by heating it by means of a small flame. On placing the two tubes on a balance it will be seen that there has been no variation in weight.

THE process of electrodeposition is now finding a useful application in the production of bronze statuary, where it promises to supersede the process of casting. The Electrometallurgical Company of Brussels have just produced a colossal statue of Van